

LISTING OF SPECIFICATION AMENDMENTS

Please replace paragraph [0013] with the following amended paragraph:

[0013] The well stimulation tool is used to stimulate a well having a tubing mandrel that supports a tubing string suspended from a the tubing mandrel in a wellhead. The well stimulation tool includes a well stimulation tool mandrel having an annular body defining a mandrel bore, a top flange for connecting to a high-pressure valve and bottom threads for connecting to an adapter pin, the mandrel bore having a diameter larger than an outer diameter of a backpressure plug for plugging a central passage through the tubing mandrel to contain well pressure within the tubing string.

Please replace paragraph [0029] with the following amended paragraph:

[0029] A top end 11 of the adapter spool 12 has external threads ~~19~~31 for engagement with corresponding internal threads ~~31~~19 on a lockdown nut 30 to secure the mandrel 14 to the adapter spool 12. The lockdown nut 30 secures the mandrel 14 to the adapter spool 12 by virtue of a downwardly facing annular shoulder 30a of the lockdown nut 30, which abuts and forces downwardly on an upwardly facing annular shoulder 18a of a top flange 18 of the mandrel 14.

Please replace paragraph [0030] with the following amended paragraph:

[0030] The mandrel 14 is a generally annular body having an axial bore 14a. The top flange 18 of the mandrel may be connected to a high-pressure valve 64 (see FIG. 27). The top flange 18 of the mandrel has an annular groove 18b for receiving a ring gasket (not shown) for forming a fluid-tight seal with the bottom flange of the high-pressure valve 64. The top flange 18 further includes bores 18c which are threaded for receiving studs used to secure the high-pressure valve 64.

Please replace paragraph [0031] with the following amended paragraph:

[0031] The mandrel 14 also has a bottom end with threads for direct connection to a tubing hanger, or for ~~indirection~~ connection to the tubing hanger via an adapter pin 20. In the illustrated embodiment, mandrels rated for sour well service (i.e. wells with high concentrations of sulfur dioxide and sulfite) have internal threads for receiving the

adapter pin 20. For sweet well service (i.e. wells with low concentrations of sulfur dioxide and sulfite), the threads are external. This is a matter of design choice and is provided so that a sweet service mandrel 14 or adapter pin 20 is not mistakenly used when sour service equipment is required. As will be understood by those skilled in the art, this convention need not be adapted and has no bearing on the function of the well stimulation tools in accordance with the invention.

Please replace paragraph [0032] with the following amended paragraph:

[0032] The adapter pin 20 is an annular body with an axial bore 20a. The adapter pin 20 has a set of upper pin threads 24 for connection to the mandrel 14, and a set of lower pin threads 25 for connection to a tubing hanger. As shown in FIG. 31, the adapter pin 20 has a thin-walled upper portion 21, a thick-walled central portion ~~21-22~~ and a thin-walled lower portion ~~22-23~~. The axial bore 20a is machined to the same diameter as the mandrel bore 14a as illustrated in FIG. 31. The mandrel 14 and the adapter pin bore 20 have an internal diameter that permits a backpressure plug to be inserted through the well stimulation tool into the tubing hanger. For example, a standard 3½-inch production tubing typically has an internal diameter of about 2.992 inches. A backpressure plug for a tubing hanger for that production tubing typically has an outer diameter of about 3.025 inches. The bore of the adapter pin for the 3½-inch tubing must therefore be machined to a nominal inner diameter of about 3.040 inches, which provides a tolerance of about 0.015 inches to ensure that the backpressure plug will not lodge in the axial bores of the mandrel and the adapter pin as it is inserted into the tubing hanger or withdrawn from the tubing hanger.

Please replace paragraph [0040] with the following amended paragraph:

[0040] The flow tee 120 has a right flange 121 and a left flange 122 on right and left ends, respectively, of a right port 123 and a left port 124. In the configuration shown in FIG. 87, a cap 125 is fastened to the right port thereby sealing the right port. The left flange 122 is connected to a control valve 126 which is, in turn, connected to a backup control valve 128.

Please replace paragraph [0047] with the following amended paragraph:

[0047] After a given volume of fluid has been pumped or a predetermined pressure has been reached, the well stimulation fluids are removed from the well by following a procedure known as a "flow back" (step 164). The high pressure lines are then removed from the top of the well stimulation tool and the backpressure plug tool is remounted to a top of the well stimulation tool (166). The backpressure plug tool is then operated to run down through the well stimulation tool and install a backpressure plug 100 in the tubing hanger 50 or casing mandrel 70 (step 168). Once the backpressure plug 100 is installed, well pressure is ~~bleed~~bled from the well stimulation tool (step 170) and it is removed from the wellhead. The wellhead control stack is then remounted to the tubing head spool or casing mandrel (step 172). The backpressure plug tool is mounted to the wellhead control stack (step 174). The pressure is then balanced across the tubing head spool as described above (step 176). The backpressure plug tool is operated to run down through the wellhead control stack and retrieve the backpressure plug 100 from the tubing hanger 50. (Step 178). The backpressure plug tool is then removed from the wellhead control stack (step 180). Thereafter, production lines or pipe lines can be reconnected and hydrocarbon production resumed in a manner well known in the art.

Please replace paragraph [0049] with the following amended paragraph:

[0049] As will be further understood by persons skilled in the art, the methods and apparatus in accordance with the invention permit the stimulation of live wells through a production tubing string or a well casing without requiring wireline services. Consequently, service costs are considerably reduced and well stimulation procedures more quickly and efficiently performed. This results in significant time and cost reductions. As will further be understood by persons skilled in the art, although the invention has been explained with reference to particular configuration of well stimulation tools invented by the applicant, the invention can be applied to any well stimulation tool adapted to be connected to box threads at a top of a central passage through a tubing hanger ~~or~~ for supporting a production tubing string or a casing mandrel for supporting a production casing in a wellbore.